DEVELOPING A VIABLE FISH FARMING INDUSTRY IN NIGERIA - AN ALTERNATIVE STRATEGY TO THE STRATEGY IN THE GREEN REVOLUTION PROGRAMME

by

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ABSTRACT

The importance of fish as a source of protein and other essential nutrients required in the human diet cannot be over-emphasised so also is the potential contribution of a developed fisheries subsector of agriculture to overall development of the national economy. It is in the light of these facts that this study was embarked upon with the twin objectives of reviewing the Green Revolution Strategy for accelerating fish production in the country and proposing an alternative strategy, a private sector approach.

By way of providing some background information, the literature on economic development and the role of agriculture (including forestry and fisheries) in promoting same was briefly reviewed. The author then went on to review the present status of the Fisheries subsector of Nigerian agriculture highlighting constraints to the development of the fisheries industry. The fisheries programme in the Green Revolution was then examined critically.

It has been argued in the paper that some of the programmes listed in the Green Revolution are very necessary for developing a viable fish farming industry and that money spent under such programmes is money well spent. Programmes that are also desirable but need to be considerably expanded were identified. Other programmes have been criticised on the grounds that the method chosen to achieve the desired objectives is fraught with danger if sufficiently long run view of fisheries development is taken. Programmes that involve direct government operation have been criticised on the grounds that government enterprises from past experiences perform badly.

The author went on to discuss what it takes to develop a viable fish-farming industry and concludes on the note that as much as possible, a private sector approach should be adopted in the effort to accelerate fish production in the country.

INTRODUCTION

Economic development is a process by which a population increases the efficiency with which it provides desired goods and services thereby increasing per capita levels of living and general well-being. Because of the dominance of the agricultural sector of low-income countries, the interplay between development means and development objectives are particularly important in the sector. The initial size and backwardness of agriculture suggests wide scope for raising gross national product through agricultural development.

THE ROLE OF AGRICULTURE (INCLUDING FORESTRY AND FISHERIES) IN ECONOMIC DEVELOPMENT

The role of Agriculture in the development of any nation cannot be over emphasised and this has been well-documented in the literature of agriculture development (Mellor 1966, Lewis 1963, Viner 1963 and Eicher & Witt 1964) summarised for the purpose of this study. Rising agricultural productivity supports and sustains industrial development in the following ways:

1. It permits agriculture to release part of its labour force for industrial employment while meeting the increasing food needs of the non-agricultural sector;

2. It raises agricultural income thereby (a) creating the rural purchasing power
needed to buy the new industrial goods and (h) rural savings which may then be mobilized by direct or indirect means to finance industrial development;

It enables agriculture to supply food for the industrial workers at prices favourable to the profitability of new industries;

It saves scarce foreign exchange needed for financing imports of industrial capital which might have been spent on food imports;

It contributes to the integration of dualistic agricultural economies, the existence of which has often restricted the rate and spread of economic progress.

Where agricultural productivity in the food sector becomes sufficiently high the nation may enjoy a food surplus of such magnitude as to permit export of food on favourable terms.

Nichols (1963) has emphasized the "almost universal importance of having a substantial and reliable agricultural surplus as the basis for launching and sustaining economic growth. Kuznets (1961) has also pointed to the fact that in the United States of America during the period 1875 - 1945, while productivity in non-agricultural sector was increasing by about 15 per cent per decade productivity in the agricultural sector was increasing even more rapidly. The ratio of productivity per worker in the agricultural sector to productivity per worker in the non-agricultural sector increased from about 0.4 to 0.7. He concludes that "a substantial rise in productivity of resources in the domestic agriculture sector is a condition of the large increase in overall productivity in modern economic growth. It is such a rise in productivity combined with the low-income elasticity of demand for products of the agricultural sector that accounts for the marked decline in the total labour and capital used".

THE AGRICULTURAL SECTOR IN NIGERIA

Agriculture is the most important sector of the Nigerian economy. Until very recently, it contributed 60 per cent or more of Gross Domestic Product. Its percentage contribution has since fallen especially with the boom in the petroleum industries and the growth of the industrial sector in recent years. (See Table I). Nonetheless, the sector still provides employment for over 70 percent of the Nigerian population.

Nigerian agriculture is characterized by low farm incomes low levels of capacity to satisfy the food and fibre needs of the country and primitive techniques of production. As a matter of fact, Nigerian agriculture is a typical peasant agriculture which has been described by several authors as caught in a vicious cycle of poverty - low income leading to poor savings and little investment in yield - increasing technology; poor technology results in low output and low income.

THE FISHERIES SUB-SECTOR OF NIGERIAN AGRICULTURE

An important subsector of Nigerian agriculture is fisheries. Nigeria enjoys exclusive fishing rights over 256,000 Km² of the adjoining Atlantic Ocean (80 Km coastline x 320 Km) termed 'Exclusive Economic Zone' (E.E.Z.). In addition, the country is rich in perennial rivers (Niger, Benue, Ogun, Oshun, Cross etc.), natural Lakes like Chad etc., man-made lakes like Kainji, and other dams and ponds.

Nigeria's Fishing Industry is classified into Artisanal fishery and Industrial fishery. Artisanal fishery is carried out in Coastal and brackish waters as well as inland in lakes and rivers while industrial fishery is carried out in deep coastal water as well as deep sea water and includes shrimping.

The artisanal fishermen numbered more than 400,000 in 1975 and judging from the trend in national population growth rate, this number is likely to rise. They are scattered all over the country using traditional and out-moded canoe - fishing method with very low output. Their activities are limited to the Creeks,
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<tr>
<td>1. Agriculture</td>
<td>66.6%</td>
<td>62.2%</td>
<td>54.9%</td>
<td>37</td>
<td>46</td>
<td>47</td>
<td>37</td>
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<td>21</td>
<td>19</td>
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<td>18</td>
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<td>2. Mining and Oil</td>
<td>1.1</td>
<td>1.9</td>
<td>7.2</td>
<td>10.0</td>
<td>15.0</td>
<td>17.0</td>
<td>24.0</td>
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<td>27.4</td>
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<td>3. Industry</td>
<td>5.3</td>
<td>9.9</td>
<td>11.8</td>
<td>13.0</td>
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<td>15.0</td>
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<td>4. Transport and Communication</td>
<td>4.8</td>
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<tr>
<td>5. Distribution Services</td>
<td>22.2</td>
<td>21.2</td>
<td>22.1</td>
<td>37.6</td>
<td>23.3</td>
<td>21.6</td>
<td>21.1</td>
<td>50.0</td>
<td>39.9</td>
<td>33.9</td>
<td>33.0</td>
<td>34.0</td>
<td>32.6</td>
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Note: Figures are estimates based on the new set of national Accounts in respect of 1973/74 Financial year prepared by the National Accounts Survey Team of 1973.
brackish water, lagoons and rivers all over the country.

The percentage contribution of artisanal fisheries to domestic fish supply has dropped steadily over a five-year period from 84.72 per cent in 1974 to 9.41 per cent in 1978 (see Table 2). This is because while inland fishery catches have remained fairly constant, there have been big jumps in the amounts of products of industrial fishing especially coastal (shrimp) and distant water (imports).

The industrial Fishery is mainly marine and capital intensive. It is carried out in distant waters involving the use of deep - sea trawlers or in-shore, operating within the continental shelf. This type of fishery has for long been dominated by foreign owned trawlers which operate on charter arrangements with Nigerian Companies.

THE CONSTRAINTS TO THE DEVELOPMENT OF FISHERY INDUSTRY

The major constraints to the development of the fisheries industry in Nigeria include:

(a) Lack of funds by indigeneous fishermen to purchase fishing vessels, cold storage and other equipment.

(b) Lack of adequate fishing terminals and other infrastructural facilities.

(c) Shortage of trained manpower.

(d) Inadequate supply of inputs such as boats, engines, nets etc.

(e) Poor communication network in the producing area affecting fish distribution, marketing and extension work.

(f) Lack of sufficient fishermen's cooperatives to benefit from government financial assistance schemes.

THE POTENTIAL CONTRIBUTION OF A DEVELOPED FISHERY SUB-SECTOR OF AGRICULTURE TO NATIONAL DEVELOPMENT

Like the agricultural sector of which the fisheries subsector is a part, increased productivity in the subsector has immense contributions to make to the process of national development. These contributions will be discussed under food/nutrition, employment generation, enhanced savings potential through increased income, enfranchisement of the economically disfranchised in the society and linkage effect in the economy.

FOOD/NUTRITION

An important indicator of economic development is freedom from hunger/dwindling level of mortality (infantile and adult). No country in the world can claim to be developing if a substantial proportion of the population is experiencing slow death from malnutrition. It is a generally acceptable fact that the quantity of protein in the Nigerian diet is very inadequate. Of even more serious concern is the small proportion of protein that comes from animal sources. Whilst the world standard body requirement is about 70 grams, it has been estimated that the protein intake of an average Nigerian is 62 grams daily and that the large proportion of this is of plant origin which is of low quality. Malnutrition causes retardation of physical growth and development and recent evidence strongly suggests that mental development may be impaired also. For the malnourished child, mortality and morbidity are extremely high and common infectious diseases are catastrophic.

*A diet deficient in protein (or other nutrients, vitamins and minerals) leads to malnutrition.
Table 2 - Nigerian fish production by Sector 1974 - 1978
(Unit-metric tons)

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<tr>
<td>Grand Total A + B C</td>
<td>548,100</td>
<td>520,001</td>
<td>621,591</td>
<td>633,243</td>
<td>727,381</td>
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<tr>
<td>1. Artisanal</td>
<td></td>
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<tr>
<td>(i) Coastal &amp; Brackishwater</td>
<td>257,288</td>
<td>247,620</td>
<td>261,128</td>
<td>284,958</td>
<td>287,976</td>
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<td>(ii) Inland:</td>
<td></td>
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<tr>
<td>(a) Lakes</td>
<td>67,275</td>
<td>67,975</td>
<td>71,468</td>
<td>68,590</td>
<td>76,091</td>
</tr>
<tr>
<td>(b) Rivers</td>
<td>140,764</td>
<td>140,418</td>
<td>133,558</td>
<td>136,950</td>
<td>143,957</td>
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<tr>
<td>A. Sub-Total Artisanal</td>
<td>465,327</td>
<td>456,013</td>
<td>486,154</td>
<td>490,498</td>
<td>508,026</td>
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<td>2. Industrial (Commercial)</td>
<td></td>
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<tr>
<td>(i) Coastal (Fin. Fish)</td>
<td>5,768</td>
<td>8,057</td>
<td>8,725</td>
<td>13,767</td>
<td>15,245</td>
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<tr>
<td>(ii) Coastal (Shrimp)</td>
<td>2,098</td>
<td>2,117</td>
<td>1,763</td>
<td>2,225</td>
<td>1,910</td>
</tr>
<tr>
<td>B. Sub-Total Inshore Industrial</td>
<td>7,866</td>
<td>10,174</td>
<td>10,488</td>
<td>15,992</td>
<td>17,155</td>
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<td>C. Distant water (Imports)</td>
<td>74,907</td>
<td>113,841</td>
<td>124,879</td>
<td>126,753</td>
<td>202,208</td>
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<tr>
<td>Local Production</td>
<td></td>
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<tr>
<td>figs A + B</td>
<td>473,193</td>
<td>466,187</td>
<td>496,645</td>
<td>506,490</td>
<td>525,181</td>
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Source: Federal Department of Fisheries.
Adequate nutrition has a vital role in the health of adults as well as children and profoundly influences socio-economic and cultural development. Malnutrition leads to deterioration of physical fitness and mental efficiency, to emotional and personality disturbance and to reduction in the capacity to perform work.

Fish is an important source of protein and other essential nutrients required in the human diet viz. minerals. Increased productivity in the fisheries industries will not only make available more fish food to the ever increasing population of this country, but will also ensure that the price of such is within the reach of the average Nigerian. It has been estimated that the current effective yearly demand for fish in the country is in the region of one million metric tons as against the supply from all sources of about 800,000 metric tons. Of this amount about 510,000 metric tons is produced locally leaving the balance to be met from imports in the form of frozen fish, canned fish and stockfish.

It is very obvious from the foregoing that a substantial amount of foreign exchange is spent on fish import to supplement domestic production. This amount is expected to grow as demand for fish grows in line with the general population growth rate, increase in the average level of income in the economy, changes in the distribution of population between rural and urban areas and increased awareness of the role of adequate nutrition in the society.

Increased production at home will ensure that home demand is satisfied and vital foreign exchange costs in other uses are saved. The foreign exchange are actually needed to import vital developmental goods.

**EMPLOYMENT GENERATION**

A developed fishery industry will not only lead to increased fish production, but will also stem the movement of labour prematurely out of the industry in search of urban jobs that are just not available. If earnings in the fishery industry compare favourably with what the fishermen can hope to get in an alternative employment, the odds are that they will carry on as fishermen instead of migrating into the cities to add to the 'reserved army' of the unemployed. In that way, the fisheries industry would have contributed to employment opportunities available to the country's citizens.

Apart from such direct contributions, the industry can also contribute in other indirect ways to employment generation. Once a fishing community is established it will require a host of services to keep it going. Such facilities and services will include a boatyard, a village store selling fishing equipment, an engine work shop to service and repair broken-down motorized boats, an ice plant or cold rooms a fish transport/distribution service for efficient marketing. All these facilities and service will be manned by people. Thus, the development of the industry will surely lead to increased employment opportunities in the fishing villages.

**ENHANCED SAVINGS POTENTIAL**

Although factors that affect the average propensity to save in society are diverse, there is no gain saying that the income base of the individual is a very crucial constraint on the individual's ability to save. Where an individual is living very close to the margin of subsistence, he obviously will save very little. As the income base improves so also will the average propensity to save since ability to save is enhanced. The relationship is not as straightforward and as direct as the sentence sounds because whether savings increase with income depends on the proportion of marginal income that individuals in society will be willing to save as income increase but without being too theoretical it stands to commonsense that as income rises above the basic minimum necessary to keep body and soul together, the probability that some savings will be done becomes very high.

Depending on the availability of suitable institutional arrangements for the mobilization of such savings, investment activities in the economy will also increase, all things being equal.
ENFRANCHISEMENT OF THE ECONOMICALLY DISFRANCHISED

In a society where the bulk of the goods available on the market are outside the reach of a substantial proportion of the population, there is no doubt that that section of the population has no franchise as far as the production system in that community is concerned. Apart from the psychological effect of such disfranchisement on the personality of the individual, the economy at large stands to lose in that the process of industrialization in such an economy gets to a point where it can proceed no further unless a mass market can be created for it and a mass market can only be created for industrialization by putting purchasing power in the hands of the masses. Where a fisherman who in the past had managed to earn under N200 per annum can be aided to make an annual income of N500 per annum, the process of enfranchisement of the disfranchised has gone a long way, poverty has been substantially reduced which is an indication of development. As a matter of fact, it has already been reported that a group of fishermen beneficiaries of the Green Revolution Programme have made annual income of over N5000 per annum which is a substantial rise in the traditional income of the fishermen. This enhanced income level will not only improve the purchasing power of the fisherman and increase the effective demand in the economy, but by making the fisherman's income comparable with income from other jobs, it will also ensure that mass exodus of fishermen to the cities is stemmed and that many more people who have already migrated into the cities in search of white-collar jobs return to the countryside to take up fishing as a profession. It has, in fact diminished inequality of income as between the fisheries sub-sector of agriculture and the urban sector of the economy which is another indication of development.

LINKAGE EFFECT

As already mentioned, a developed fisheries industry will need some supportive services and institutions. Broken vessels will need to be mended, fishing gears will be demanded refrigerated trucks will be needed to transport fish from fishing villages to marketing centres. As long as these demands are directed towards relatively simple and inexpensive implements which are within the technical capabilities of small-scale decentralized local industries, the growing market for fishing gears and implements can provide a strong stimulus to industrial expansion. This point leads us to the objective of this paper which is the critical examination of the Green Revolution Strategy for developing the fisheries sub-sector of agriculture and the discussion of an alternative strategy - laying the foundation of a viable Fish Farming Industry.

FISHERIES IN THE GREEN REVOLUTION PROGRAMME

From all available documents, it would appear that efforts of the Federal Government to accelerate fish production in the country have been concentrated largely on the following projects:

(a) National Accelerated Fish Production Project (NFP)
(b) Inshore Fishing Project
(c) Fish Seed Multiplication Project (FSMP)
(d) Establishment of Small Scale Fish Farms
(e) Fishing Terminal Projects
(f) Fish Storage, Processing and Marketing Scheme
(g) Formation of Joint Venture Fishing and Shrimping Companies
(h) Special Fisheries Development Project

These projects will be examined one by one.
NATIONAL ACCELERATED FISH PRODUCTION PROJECT (NAFPP)

The aim of Government in this project is to bring about development at grassroots level. To this end, essential fishing inputs have been supplied in package form at 50 per cent subsidy to local fishermen so as to enhance increased fish production.

(b) Inshore Fishing Project

This is aimed at upgrading small-scale artisanal fishermen into the modern trawling industry. It would appear from all indications that this objective will be achieved by statutory allocation of fishing boats to Fisheries Cooperatives in different parts of the country, training of Nigerians at professional and technical levels and the importation of experts from abroad. Thus, under the scheme, one boat has already been handed over to the Cross River Fishers Co-operative Association in 1979. Arrangements are on hand to hand over two more boats to selected cooperative societies in two other states while forty-two medium sized fishing boats have been ordered from Poland. Agreements have also been reached to train suitable Nigerians in appropriate Polish Institutions for one and three-year periods respectively and also for the supply of various Polish Fisheries experts for a duration of up to one year.

(c) Fish Seed Multiplication Project

This project is designed to utilise the vast areas of water created by the major irrigation dams and canals constructed by the River Basin Development Authorities all over the country for fish production.

(d) Establishment of Small Scale Fish Farms

Six model fish farms are being constructed in different parts of the country.

(e) Fishing Terminal Projects

These involve the building of four modern fishing terminals at strategic points along the 800 Km Nigeria’s coastline with facilities for fish landing storage, processing and distribution as well as maintenance and repairs of fishing vessels. The projects are yet to take off due to various reasons.

(f) Fish Storage, Processing and Marketing Scheme

This scheme provides for the establishment of necessary facilities such as fish storage, processing and distribution facilities at strategic points especially in the five coastal States as well as Lakes, Chad and Kainji. They include cold storage, refrigerated trucks and barges, smoking kilns, dehydration plant, dry storage and marketing sheds.

So far, 12 10 - ton refrigerated trucks have been purchased at total cost of ₦375,000 and allocated to 12 States. A 21 - ton storage has been constructed at the Lagos Head Office of the Federal Department of Fisheries and the installation of a fish processing complex is nearing completion at Ikot-Abasi in Cross River State. Furthermore, fish has been allocated 1,000 tons cold storage space in the nation-wide establishment of cold stores for meat, fish, fruits and vegetables.

(g) Joint-Venture Fishing and Shrimping Companies

Two companies, Nigerian National Shrimp Company and Nigerian National Fish Company have been incorporated as joint ventures between the Federal Government, the NIDB, the NBCI and Foreign Management Partners with the purpose of exploiting the vast resources of Nigeria’s territorial waters as well as those of other West African Countries by special arrangements.

The two companies have been firmly established with the shrimp company operating 16 - shrimp Trawlers while the Fish Company is yet to take off. It is hoped that when fully operational these companies would make appreciable contribution to shrimp and fish production in Nigeria for both export and home markets.
Special Fisheries Development Project

Under this project, a newly-built 76-footer vessel owned by the Federal Department of Fisheries will assist in exploratory fishing and inspectorate efforts of the Federal Department of Fisheries.

From the foregoing, the various fisheries efforts in the Green Revolution can be classified under four (4) broad headings:

1. Small Scale Fishermen improvement Schemes under which fall b & c above;
2. Fisheries Infrastructures Provisions/Improvement under which c, e and f could be classified;
3. Government Fisheries Enterprises under which g falls; and
4. Fisheries Demonstration/Extension Efforts under which d and h could be classified.

CRITICISMS OF THE PROGRAMME

It is obvious from the list of constraints to fish production presented in this study that some action programmes are necessary to remove the constraints and enhance productivity in fish production. The Fisheries programme in the Green Revolution is a direct endeavour by the Federal Government to meet this challenge. Whether this programme is the most efficient way of tackling the problem is the concern of this study and to investigate this, the various efforts of the Federal Government in the programme has been classified under four (4) broad headings that will be examined one at a time.

SMALL-SCALE FISHERMEN IMPROVEMENT SCHEME

Even though, the percentage contribution of artisanal fisheries to domestic food supply has dropped steadily, it is in the best interest of the nation to help the small-scale fishermen improve productivity for a number of reasons. For one thing, these people constitute a not insignificant proportion of the population and as such, from the welfare point of view, they are entitled to a decent level of living. They can only achieve this by earning higher income in their chosen job in the absence of which they abandon the job in search of more lucrative jobs in the cities. Since job opportunities are limited in the cities they join the reserved army of the un-employed in our major cities with all the undesirable effect of such an institution in the form of social delinquency, squalor development etc. Thus, the Government has a responsibility to raise income of these fishermen both from the welfare point of view of earning a decent income and from the related point of view of provision of gainful employment. And of course from the point of view of providing food of the right quality at reasonable price, the Government also has a stake in improving the productivity of these fishermen.

For the reasons enumerated above, small-scale fishermen improvement schemes will be in order. What may be questionable is the method chosen to achieve this objectives. So far, all efforts in this direction have been concentrated exclusively on heavy subsidies and outright grants. To this author, this approach is fraught with dangers if sufficiently long run view of fisheries development is taken. There are also problems of logistics to be battled with even in the short-run.

In subsidizing heavily the prices of these inputs, the free functioning of the
price mechanism is disturbed. Resource allocation in society which is the primary function of the price system is distorted so that in the long run, the pattern of resource allocation that results from this Government action deviates from the optimum. Inefficient fishermen who should have been forced out of business are protected and resources are malallocated as between the fisheries industry and other industries. As a matter of fact, the problem that often arises with subsidy schemes is "where does it stop?" Fishermen may develop what has been termed the "dependency mentality" whereby they come to think that input subsidies are a permanent feature of their industry and that successive governments owe them an obligation to continue to grant farm input subsidies.

Moreover, these subsidies to have a cost. If proper cost-benefit analysis of the scheme is done, the cost to society may exceed the benefit. Nothing categorical can be said about this off-hand, in the absence of a proper cost benefit analysis. The cost of such subsidies fall into two categories, direct cost of the exchequer and social cost (which can be reckoned in terms of opportunity costs). Benefits are also both direct (in terms of increased production and lower price) and indirect (in terms more employment, higher standards of living for fishermen thriving fishing villages etc). The conclusions stand out clear from all said above. In the first place, an improvement programme that is built almost exclusively on heavy input subsidies may or may not achieve the objective of Government in the short-run depending on how efficient the logistics machinery of government works; in the long-run, it results in malallocation of resources by ensuring that inefficient enterprises are protected. Added to these is the fact that it constitutes an unnecessary drain on the meagre financial resources of the nation.

FISHERIES INFRASTRUCTURE PROVISION/IMPROVEMENT

Considering the list of constraints to increased production, there is no doubt whatsoever that money spent on the provision of improvement of basic infrastructural facilities is money well spent. It has been estimated that about 50 per cent of local fish production from the remote coastal centres and in the hinterland perish because of the inadequate or sometimes total lack of fish storage, processing and distribution facilities. It is gratifying to note that satisfactory progress has been made with respect to the provision of storage processing and marketing scheme, one would only wish and hope that the Fishing terminal projects and the Fish seed Multiplication project are allowed to take off early and not unduly delayed by red-tapism which is the fate of many public sector projects.

GOVERNMENT FISHERIES ENTERPRISES

The formation of the Nigerian National Shrimp Company and the Nigerian National Fish Company in which the Federal Government in conjuction with the NIDB, the NBD foreign Management partners hold equity participation should be seen as the participation of the public sector in running commercially - oriented projects. Well, the only good thing about the whole affair is that it is a joint venture and as such one would not be too pessimistic about the prospects of the two companies. Experience has shown that solely owned and operated Government business enterprises perform very poorly. Despite the trend in developing countries to use public sector investments as a catalyst for achieving the much desired goal of economic development and structural transformation, it would appear that the public sector has too many structural rigidities of its own to be able to cope with the demand of commercially oriented enterprises. This fact alone points to the superiority of a development strategy that relies primarily on private sector investments.

EXTENSION/Demonstration PROGRAMMES

The construction of six model fish farms would suggest Government's intention to demonstrate the feasibility of making decent income from fish farming. As a matter of fact, economic rate of returns from such a venture has been put at about 15.4 per cent. One only hopes that these particular ventures perform up to expectation. There have been instances of Government Demonstration Projects in plantation agriculture that have turned out to be economic disasters. The scales of operation
have usually been too large to justify the claim that they were to demonstrate the feasibility of modern farming enterprises. Establishment costs have also been so high relative to output that replication of the models outside the demonstration plots by private individuals have been unprofitable and in fact near impossible. As a matter of fact these high establishment costs also limited the replication of these investments by a Government with scarce budgetary resources. They also rule out the possibility of widespread adoption by private investors reducing the projects demonstration effect to nil. One only hopes that the Federal Government has learnt useful lessons from such projects.

TOWARDS A VIABLE FISH-FARMING INDUSTRY

From the brief discussion of the potential contribution of fish farming to the national economic development process, there is no substitute for a viable fish-farming industry. Developing a viable fish-farming industry involves much more than building the necessary fisheries infrastructure and providing 50 per cent subsidy on fishing inputs. It involves more than building six model fish-farms for a country as big as Nigeria. There is the need to build an energetic extension service or advisory service to demonstrate the yield potential of new inputs and practices. It is only after prospective adopters are convinced of the profitability of a new venture that they take the risk of investing in the unfamiliar line. In this regard, building or construction six model farms for the whole country will seem but a drop in the bucket compared to the task facing the advisory service. Constructing one model farm in each State may seem a modest beginning. The ultimate target of government should be constructing one model fish farm in each fishing community. This is the more reason why such model farms should be modest in scale and approximate as closely as possible to what the average fishermen can afford to construct.

As much as possible, a private-sector approach should be adopted. Budgetary transfers in the form of subsidies and boat donations should be discouraged. Farmers should be encouraged to pay the full market costs of inputs to ensure optimum resource allocation both within the fishing industry and within the economy at large and to save scarce budgetary resources that have alternative uses in the economy. Where causes of private sector failures have been identified to be connected with defective institutional arrangements, Government can usefully intervene in carrying out institutional reforms. In this regard, the marketing system, credit arrangements and infact landholding arrangements are institutions that can constrain improved performance in fishery. These fall within the areas of infrastructure and ideally, this is the area where Government assistance is most needed. Thus, having demonstrated the feasibility of making high returns in fish farming, the Government should go on to provide the necessary infrastructures to make for smooth running of production and distribution and then leave the rest to the private sector. It suffices to close this study with a comment by Walgang Stolper (1966).

"It is a waste of resources to use scarce administrative talent where less qualified people could do the job; to use specific means for a specific job when general policies could reach many more people and utilise more resources more effectively".

SUMMARY AND CONCLUSION

Fish is an important source of protein and other essential nutrients. Required in the human diet. An increase in fish production will not only make available more fish for the ever increasing population of Nigeria, but will also ensure that the price is within the reach of the average Nigerians.

It has been estimated that the current effective yearly demand for fish in the country is in the region of one million metric tonnes as against the supply from all sources of about 800,000 metric tonnes. Only 510,000 metric tonnes is produced locally while the rest is imported in the form of frozen fish, canned fish and stock fish. This means spending a substantial amount of foreign exchange on fish import to supplement domestic production. Future demand for fish is expected to grow in line with the general population growth rate, increase in the
average level of income in the economy, changes in the distribution of population between rural and urban areas and increased awareness of the role of adequate nutrition in the society. Increase in local production will ensure that domestic demand is satisfied and vital foreign exchange which have high opportunity costs in other uses are saved.

It is in the light of the foregoing and the various other contributions of a developed fisheries subsector of agriculture to the process of national development that this paper examines critically the Green Revolution Strategy for developing the fisheries subsector of agriculture in Nigeria and suggests an alternative strategy.

The various programmes listed in the Government Green Revolution Strategy are classified under four broad headings namely:-

(1) Small-Scale Fishermen Improvement Scheme;
(2) Fisheries Infrastructures Provision/Improvement;
(3) Government Fisheries Enterprises; and
(4) Extension/Demonstration Programmes.

Each of these activities is critically appraised. The conclusion from the exercise is that some of the programmes especially those classified under Fisheries Infrastructures Provision/Improvement are very necessary and that money spent under such programmes is money-well-spent. While other programmes especially those classified under Extension/Demonstration Programmes are welcome, they should be considerably expanded, that is government activities in this direction have not gone far enough. Programmes classified under small-scale fishermen improvement schemes have been criticised on the grounds that the method chosen to achieve the desired objective, namely, heavy government subsidies is fraught with dangers both in the short and in the long run. The last group of programme classified under Government Fisheries Enterprises have been criticised on the grounds that government enterprises, from past experiences, perform badly and that the public sector has too many structural rigidities to be able to cope with the demands of commercially oriented enterprises.

The paper concludes that there is no substitute for a viable fish-farming industry which is based entirely on private investment. Farmers should be encouraged to pay the full market price of inputs to ensure optimum resource allocation both within the fishing industry and within the economy at large and to save scarce budgetary resources (which are now used on subsidies and outright grants/donations - budgetary transfers) which have alternative uses in the economy. Government activities should be confined to two important areas. First Government should concentrate on building an energetic extension/advisory service to demonstrate the yield potential of new inputs and practices which will convince prospective adopters of the profitability of fish-farming and encourage private investment in the unfamiliar enterprise. In this regard, the construction of model fish-farms all over the country is advocated with a caveat that such model farms should be modest in scale and approximate as closely as possible what the average fishermen can afford to replicate. Secondly, having demonstrated the feasibility of making high returns in fish farming, Government should go on to provide the necessary infrastructures to make for the smooth running of production and distribution.

REFERENCES


J. Viner (1963) "The Economics of Development" in Argawala and Sighn, op. cit.

